

## Multi-objective optimization control of plug-in electric vehicles in low voltage distribution networks. - DTU Orbit (09/11/2017)

### Multi-objective optimization control of plug-in electric vehicles in low voltage distribution networks.

The massive introduction of plug-in electric vehicles (PEVs) into low voltage (LV) distribution networks will lead to several problems, such as: increase of energy losses, decrease of distribution transformer lifetime, lines and transformer overload issues, voltage drops and unbalances. In this context, this paper proposes a new multi-objective optimization algorithm in order to reduce the mentioned problems. At the same time, users' interests in terms of charging cost and privacy have been taken into account. The proposed multi-objective optimization is based on minimizing the load variance and charging costs by using the weighted sum method and fuzzy control. The use of vehicle to grid (V2G) concept and load forecast uncertainties have been also considered. Furthermore, an innovative method for mitigating voltage unbalances has been developed. The effectiveness of this methodology has been tested using real data of a LV distribution network, located in Borup (Denmark). Simulation results show that this approach can reduce both energy losses and charging costs as well as it allows a high PEV penetration rates (PEV-PR).

### General information

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